

Remarks

The Applicants have amended Claim 15 to recite the presence of a thermosetting resin as a matrix resin. The Applicants have also added new Claim 46 which states that the thermosetting resin is an epoxy resin or a bismaleimide resin. Support may be found in Paragraph [0224] of the published version of this application. Entry into the official file is respectfully requested.

Claims 15 and 22 stand rejected under 35 U.S.C. §103 over the combination of Yamanaka, Noland or Voirol with Lewis with Nishimura '506 and Isley. The Applicants note with appreciation the Examiner's detailed comments hypothetically applying that complicated combination against Claims 15 and 22. The Applicants nonetheless respectfully submit that one skilled in the art would not make the combination and, in any event, the combination would still fail to teach or suggest the subject matter of Claims 15 and 22.

Isley contains no description of performs and there is no description as to interlamina toughening for the perform. Further, there is no description of vacuum assisted injection molding and there is no description as to a gap between carbon fiber strands, which is important in vacuum assisted injection molding to accelerate impregnation of the resin.

There is a description in Isley that it is preferred to employ a resin-impregnated embodiment, that is, the resin is impregnated beforehand (Col. 2, Lines 60-65). Thus, Isley is fundamentally different in its technical field from the claimed subject matter which solves the conventional problem in VaRTM molding and which relates to a preform in which a resin is not impregnated. Isley is also different from the other references. Therefore, there is no reason to combine Isley and the other references.

Both of Isley and the claimed subject matter are different from Nishimura '506 and there is no basis to combine Yamanaka, Noland and/or Voirol with Nishimura '506. In that regard, the Official Action first notes that even if the bonding material described in Nishimura '506 and the interlamina-toughening resin material as claimed are different in production method from each other, because the forms are the same, and if the Applicants' asserted difference therebetween, the Applicants should show the difference by examples/comparative examples in the Specification or by a Declaration.

The matrix resin used for vacuum assisted injection molding is specified as a thermosetting resin. This clarifies that the subject matter of Claim 15 has, in particular, a high advantage of "interlamina-toughening" by using "thermoplastic polyetherimide, polyphenyleneether or polyethersulfone" as the main constituent of "interlamina-toughening resin material" in a system whose matrix resin is a thermosetting resin.

Although the rejection asserts that the bonding material described in Nishimura '506 corresponds to the interlamina-toughening resin, this bonding material is different from an engineering plastic having a high glass transition temperature such as "thermoplastic polyetherimide, polyphenyleneether or polyethersulfone" of the Applicants' Claim 15, as described in Col. 3, Line 61 to Col. 4, Line 5 of Nishimura '506 that the bonding material has a low melting point.

With respect to this point, the Applicants enclose the following data as comparison experimental data using "nylon 12" included in the category described in Col. 3, Line 61 to Col. 4, Line 5 of Nishimura '506.

Comparison Experiment:

Nylon 12 was used by the Applicants as interlamina-toughening resin material, and a sample was prepared and determined in a manner similar to that of Example 7 of the Applicants' Specification other than a condition where the Vf of the molded material had the following properties.

CAI: 188 MPa (Vf = 55%)
CS / RT: 1345 MPa (Vf = 52%)
CS / HW: 841 MPa (Vf = 52%)
All layers impregnated impregnation time = middle

By comparing the above-described result with the following Example 7, the Applicants respectfully submit that mechanical properties balanced at a high level as described in Claim 22 cannot be obtained by the polymer disclosed in Nishimura '506.

Example 7

CAI: 280 MPa (Vf = 58%)
CS / RT: 1630 MPa (Vf = 59%)
CS / HW: 1260 MPa (Vf = 59%)
All layers impregnated impregnation time = short

From the amendments to Claims 15 and 22 and the explanation set forth above, it can be seen that those claims are completely different from Ishimura '506 and Isley. Moreover, there is no basis for combining Yamanaka, Noland and Voirol with Nishimura '506.

The rejection also takes the position that Nishimura '506 discloses that the resin on the surface preferably melts at the temperature of impregnation of the matrix resin and, accordingly, it would be obvious to use the same resin as the matrix resin as the resin on the surface and further it would be obvious to have the matrix resin one of polyetherimide, polyphenyleneether, and/or polyethersulfone.

The rejection recites that “it is obvious to use the same resin as the matrix resin as the resin on the surface” derived from “the resin on the surface preferably melts at the temperature of impregnation of the matrix resin.”

The description “the resin on the surface preferably melts at the temperature of impregnation of the matrix resin” used as the basis is described about the condition where the resin on the surface has a “low melting point” (Col. 3, Line 61 to Col. 4, Line 5), and it is not a description as to identification of the resin on the surface with the matrix resin. Further, assuming *arguendo* that the meaning of such a description is ignored, the matter capable of being read from the description is only that it is preferred that the melting point of the surface resin and the melting point of the matrix resin are both lower than a specified temperature (a temperature of impregnation of the matrix resin) (including a possibility that both melting points are the same), and it is explicit that it is impossible to say that the surface resin and the matrix resin are the same.

Further, in newly cited Yamanaka, Noland and Voirol, they merely disclose examples of using PES, etc. as the matrix resin, and it is not disclosed that a thermoplastic resin material is employed on the surface of a substrate in the system using a thermosetting resin as the matrix resin.

Furthermore, in vacuum assisted injection molding, it is explicit to one skilled in the art that it is necessary to use a matrix resin having a low viscosity at the temperature of injection at which the resin to be injected is not decomposed, and that it is impossible to use a thermoplastic resin (PES, etc), which is used for interlamina-toughening in the Applicants’ claimed subject matter and whose melting point is high because of its high thermal resistance, as a matrix resin. Thus, it is impossible to impregnate PES, etc. into the perform by vacuum assisted injection

molding, there is no meaning in the discussion based on the combination of such technologies having obstructed factors, and there is no reason to combine them for one skilled in the art.

It can therefore be further seen that one skilled in the art would not make the hypothetical combination of Yamanaka, Noland or Voirol with Lewis, Nishimura '506 and Isley. Withdrawal of that rejection is respectfully requested.

Claims 16 and 17 stand rejected under 35 U.S.C. §103 over the further hypothetical combination of Nishimura '160 with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Nishimura '160 does not provide further teachings or suggestions that would cure the deficiencies set forth above.

Claim 18 stands rejected under 35 U.S.C. §103 over the further hypothetical combination of Bokrath with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Bokrath does not provide further disclosure that would cure the deficiencies set forth above.

Claim 19 stands rejected under 35 U.S.C. §103 over the further hypothetical combination of Heck with the references mentioned above with respect to Claims 15 and 22. The Applicants respectfully submit that Heck does not provide further disclosure that would cure the deficiencies set forth above.

Claims 15-17 and 22 stand rejected under 35 U.S.C. §103 over the combination of Yamanaka, Noland or Voirol with Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants have already established that combining Nishimura '160 with Yamanaka, Noland or Voirol and Lewis with Nishimura '506 and Isley is inapplicable to those claims. Accordingly, the Applicants respectfully submit that a mere rearrangement of the pieces forming the rejection does nothing to cure the deficiencies set forth above with respect to the earlier combination.

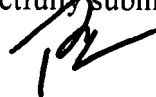
Therefore, the Applicants respectfully submit that this reworked combination is inapplicable to Claims 15-17 and 22.

Claim 18 stands rejected under 35 U.S.C. §103 over the combination of Bokrath with Yamanaka, Noland or Voirol and Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants respectfully submit that the rejection is inapplicable for the same reasons set forth above with the earlier arrangement as it applied to Claim 18. Withdrawal of the rejection is respectfully requested.

Claim 19 stands rejected under 35 U.S.C. §103 over the combination of Heck with Yamanaka, Noland or Voirol and Lewis, Isley, Nishimura '506 and Nishimura '160. The Applicants respectfully submit that the rejection is inapplicable for the same reasons set forth above with the earlier arrangement as it applied to Claim 18. Withdrawal of the rejection is respectfully requested.

In light of the foregoing, the Applicants respectfully submit that the entire Application is now in condition for allowance, which is respectfully requested.

Respectfully submitted,



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